

# DRAGON USER



*The independent Dragon magazine*

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April 1986

A colorful cartoon illustration of a knight in a green tunic and red hose running through a stone path. He is holding a yellow key in his right hand and a basket of gold coins in his left. He is surrounded by various monsters: a large eagle on the left, a black dragon on the right, and two blue, bat-like creatures at the bottom. In the background, there is a castle with towers and a blue sky with clouds.

## Clever Code

## DIY Expert

## Micro Vision Compo Communication







# DRAGON USER



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## How to submit articles

The quality of the material we can publish in  
Dragon User each month will be a very great  
extent dependent on the quality of the  
submitted material that you can make with your  
Dragon. The Dragon computer was launched  
on to the market with a powerful version of  
Basic, but with very poor documentation.

Articles which are submitted to Dragon  
User for publication should not be more than  
3000 words long. All submissions should be  
typed. Please leave wide margins and a  
double space between each line. Programs  
should, whenever possible, be computer  
printed on plain white paper and be accom-  
panied by a tape of the program.

We cannot guarantee to return every  
submitted article or program, so please keep  
a copy. If you want to have your program  
returned, you must include a stamped,  
addressed envelope.

# Contents



## News

Quickturn's "Shuttle Master" update —  
Steve report from Cardiff — Plus follow-up  
Show in Leeds — Microtest to organise  
two conventions this year — Details inside  
— Plus Total Eclipse update ... and more!

## Communication

Have you got a problem...? There are want to  
hear about it. Send all your Dragon-related  
queries to us and get results fast! Or maybe  
this is your chance to help someone out?

## Letters

Your chance to express your views to  
thousands of other Dragon Users. This  
month (amongst others) — more bulletin  
board numbers — update on C64 Users  
group — the very last word on telecommunications  
— plus your letter (telescope ... that's next  
month, isn't it?)

## People's Chart

This is it, the results of the first People's  
Chart, compiled by you, the Dragon User —  
plus your chance to vote in Chart Number  
Three. Vote! Vote! Vote!

## Expert System

They say everyone's an expert at some-  
thing — so why not try creating your own  
expert system, using this program by Peter  
Whitaker.

## Hardware

The new MCT controller, from Com-  
puScene, opens up vast new applications  
for your Dragon — from budget alarm to  
telemail. Was Roy Coates impressed?  
Read on for details.

## 4 Destructor!

The Girth is in peril — yet again — and  
naturally, only you can save it. Defuse the  
three bombs that are set to blow our world  
to bits ... all in machine code from the  
keyboard of Steve Gathache.

## 5 Machine Code Tutor

Meat, Jason Orbaum and Geoffrey  
Campbell continue our exploration into the  
world of machine code — this month  
discussing chip architecture and flow-  
charting.

## 6 Software

Jason Orbaum's selection for this month —  
the good, the bad, the miserably ineffectual  
— can you afford not to read this?

## Dragon Answers

More technical answers to a whole bunch of  
readers' technical ... and not-so-technical  
questions ... from the keyboard of the  
seasonally knowledgeable Brian Cadge.

## Adventure Trail

Mike Gerrard collects the usual assortment  
of wails and wails of the adventure world  
and puts them back on the straight and  
narrow. Tips galore ...

## Firmware

All good things come to an end ... and  
judging by the mail bag, this one has been  
particularly popular. The final instalment of  
the Dragon Firmware guide.

## Competition

Gordon Lee ponders the improbables this  
month and sets his usual brain teaser —  
which presents you with a chance to win a  
copy of Mike Vision's Beerslacker.

# Editorial

ORDERING goods by mail has always been a bit of a strange business. For  
a start, apart from the massive glossy household catalogues, the range of  
goods available via this strange transaction always seem to be — well — a  
bit out of the ordinary. Take a look at the classified ads in your Sunday  
newspaper. Wholesale cassettes, Tapes and 3-Ray specs ... hardly run  
of the mill. Plus, if you think about it, the actual act of faith in sending some  
money off to a strange address and hoping something will come back  
seems on a par with expecting trains to run on time, or England to beat the  
West Indies. And when it does arrive — is it really what you wanted in the  
first place?

Luckily for us, actual crooks are very few and far between in the computer  
market, but as recent events have shown, delays that drag on for weeks and  
months cause unnecessary worry, are downright frustrating and (worse of  
all) cause a lack of confidence in the system that hits every company —  
good and bad. So what can the consumer do?

You can always read the reviews in Dragon User of course, but this is the  
area where shows come into their own. At a show, you can meet the people  
behind the companies. Look at the goods and form your own opinions, chat  
to other users. Even if you can't make it to a show physically, you can bet  
that if someone is exhibiting regularly, then they are run by enthusiasts,  
active Dragon supporters.

So, if there's a show near you, why not pay it a visit. In fact, you'd be deft  
not to. As the lawyers say, "Let the buyer beware".



## South Wales success

THE 'Dragon comes home to Wales' show, held on 15th February in Cardiff, was by all accounts quite a success — with a total attendance of around 700. Trade supporters included Blais, Compuseries, Compulaps, Gargan, Gwynne, John Penn, Ramcorne and Peacock. "Everyone that came seemed happy," said organiser John Penn, "and we've already had quite a few nice letters." The event generated a great deal of interest — with people coming from as far away as Birmingham — and coverage from GWN Radio and the Western Mail.

So much so, in fact, that a repeat performance is already in the advanced planning

stage — this time to be held in the Leodares, in the middle of May.

But in addition to the usual trade exhibitors, John is hoping to encourage users to come along and actually show the public what varied uses they can put to. "Radio communications, Model train controllers, that kind of thing," explained John. "We're trying to show people what can be done with their computers." He added, "We're continuing to support the Dragon in every way we can — trying to bring all aspects of Dragon use — not just a roadshow."

Anyone who feels they have a project that might be of interest, contact John Penn on Bodon (04205) 5070.

## Eclipsed

FOLLOWING coverage of delays to the game Total Eclipse (Dragon User March 1986), West Midlands Consumer services were inundated with calls from disgruntled readers.

Although at the time of going to press, Eclipse was unavailable for comment, reports were coming in of the arrival of the game from all over the country. As soon as our copy arrives, expect a full review. Watch this (empty) space.



## Extra!

WILLING that will interest potential purchasers of Quickbeam's Shaolin Master — the game now has an extra bonus, a 'Challenge Screen' between bouts — but don't worry if you've already bought it. Quickbeam's Dave Hitchman is offering the upgrade to ex-

isting owners just for the postage. Send your tape back to them with the appropriate number of stamps and you'll get your upgrade, for no extra charge.

For first time purchasers, the price remains at £7.95 plus 50p P&P. Contact Quickbeam Software, 67 Old Nutsing Road, Brockbourne, Warrs. EN10 6RN.

## Hold the Bus!

ANDTEK Data Design are now offering a BUS Expansion available to the Dragon or Tandy colour computer user. Called Addbus it consists of a buffer cartridge, and a compact, six slot, Expansion Unit. Cartridges can be mixed with Disk interfaces, or used simply as a peripheral I/O Expansion Bus. The user is offered the choice of cartridge selection, from a digital switch, or under software control, either from cartridge or local program. Additionally an 8-bit iCyscaler Port configured as a Centronics

Printer Interface is a standard in-built feature.

Andtek's future plans include the release of an 80 column card, ROM Disk Card, and RAM Expansion, all with the enthusiastic upgrade in mind.

Addbus is offered as a set of P.C.B.s, cartridge case, and construction/operation manual, at £28.95. Also available fully built, and tested. For full details, please write to: Andtek Data Design, 41 Peabworth Road, Harrow, Middlesex HA1 3UD.

## Now Showing

SEE more show news, this time from Microval, who are holding two 6808 Conventions, one in London in November, and one at CMIST in Manchester, to be held over the weekend of April 5th and 7th.

Apart from trade exhibitors (already 18 in number) a major feature of the convention will be a series of lectures (three per day) covering various aspects of 6808 computing,

supported by a panel of experts to receive extended question and answer sessions after each lecture. Microval are also throwing open the doors to any user groups or adventure clubs that want to use the facilities. Entrance is expected to be £1.75 for adults, 75p for children. Said spokeswoman Jennifer Pope, "We're expecting to take Manchester by storm!"

For further details about accommodation, venue and availability of club space, contact Jennifer on (0729) 59020, or write to Box 68, St Asaph, Cornwall PL25 4YB.

## Weekend away in Wales

IF YOU'RE still thinking about going to the Dragon 'Weekend in Wales' (see Dragon User Feb. 1986) at the end of this month, you'd better make your mind up soon! Says event organiser Bob Morgan, "Bookings are going very well, but some places may still be available. We're looking forward to an exciting weekend." Bob is particularly looking for a few more experienced D8-trusters, so if that's your cup of tea, why not give it a try?

The event is to be held at the Trevelyan Hotel, Aberdovey in Gwynedd over the weekend of 21-23rd, with a variety of talks and demonstrations planned — including an appearance by our very own Brian Cadge on the Saturday.

The cost, fully inclusive of accommodation and board will

be £45 per person. Interested parties contact Bob at the Mid Wales Tourism Council on 0454 3654.

## Black Box

UNTIL recently, the major problem with converting joystick for the Dragon has been that the actual conversion, no matter how careful, automatically invalidated the manufacturer's warranty. However, these clever Peacock people have come up with a remedy, in the shape of a little black box, called the Dragomiser. The box just plugs in between the unconverted 9-pin Atari-type joystick and your computer — it's as simple as that...

Initially, Peacock will be supplying the Dragomiser only with the Quickshot II Autoline joystick — at an inclusive price of £14.95.

Contact Peacock at 46 Queen Street, Bideford, Devon, PL6 8BB. Tel (0326) 705230.



# Communication

Send in your questions, requests, and plans to Communication, Dragon User, 12/13 Little Newport Street, London WC2E

**Problem** I have acquired a copy of Speculator (Radio Shack for Tandy Co-Ed), a spreadsheet in cartridge form. Is there any way I can get it to perform on my Dragon 32? I have no instructions for it, and every time I start it, I get the spreadsheet layout and an entry request. Pressing keys registers a very slow response, but I am unable to transfer data from the entry line to the spreadsheet. The Enter key generates a command error message. Can anyone help? Alternatively, is there a good spreadsheet or Database available on cartridge?

**Enquirer** Robert Groves, 662, 17 Arden Road, Lissans, Co Arden BT28 3AL

**Problem** Prices or routines required to disable List, Break key and Reset Button.

**Enquirer** Alan Barton, 11 Ingaway, Basildon, Essex SS16 5QF

**Problem** Please help a Spanish boy who will be in your country six months. Where can I find a Dragon available to use or rent in London?

**Enquirer** Angel Vicente, 55

Riverside Gardens, King Street, London W6

**Problem** Sometimes when I try to load a program the cursor disappears too soon and the program does not load. Could you please help me?

**Enquirer** David Foster, 8 Ardson Park, Glenrothes, Fife KY8 3PT

**Problem** I am searching any literature (books, issues) concerning the Dragon (tips, games) plus back issues of Dragon User: all 1983 and before, 1984 January, April, June. Can anyone help?

**Enquirer** Lemaire Jacques,

Rue Patenier, 46 85000, Marais, Belgium.

**Problem** I can't get my Super Dragon Writer to drive a serial printer on my Dragon4 via the serial port (Dragon Data Cartridge). Help please.

**Enquirer** Matthew Lodge, Mason Motors, Holmes Chapel Road, Lich, Cheshire, Northwich, Cheshire CH13 7SL

**Problem** Last Christmas I received a Touchmaster graphics pad. After a lot of work, I eventually got my Commodore DOS Cartridge to fit into the Touchmaster expansion port, but to no avail.

When I use the multipoint program and try to save the graphics on disc, I get an FD error (Directory Full). Please can anyone tell me how I save these graphics on my Commodore Disk Drive?

**Enquirer** Andrew J. Collidge, Robin Hood Cottage, Pinfold Lane, Northrop Hall, Nr. Mole, Chard DT4 6HE

**Problem** Is it possible to link a Dragon 32 to a EDSOI Centronics computer printer and use Dragon commands? **Enquirer** James P. O'Connell, a Colorado Crescent, Western-super-Mare, Avon BS20 4QA

## Communication

Black for a routine? Need some obscure equipment? Feeling cut off? Fear not — someone, somewhere can help you! Write down your problem on the coupon below (make it as brief and legible as possible) together with your name and address and send it to Communication, Dragon User, 12/13 Little Newport Street, London WC2H 7PP. We'll publish it as soon as we can — meanwhile, maybe there's someone you can help this month!

**Problem**

.....

.....

**Name**

.....

**Address**

.....

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## OS-9 Update

I WAS rather surprised at the reply by Paul Grade to my original letter about forming an OS-9 User Group, as I had actually written to Paul, explaining to him that I did not intend to set up a rival group to the DUG. Our group are purely concerned with OS-9; we are not trying to compete with any other group, but rather to fill a void for OS-9 users.

Since my letter in October, we have successfully set up the group and we now produce a newsletter on Disk. The Newsletter supports a Public Domain Software library as well as the usual letters, articles, news and other items you would expect in a newsletter.

Our members are of all ages and come from many walks of life, with quite a number who are professionally involved in computing and are able to offer assistance to others. Our membership is mainly in the UK, but we have two members in Belgium and three in Germany. We are hoping to affiliate with the US User Group in the States and thus involving both Group's software libraries.

Our Public Domain Software Library currently has one volume (disk) completed, with another half completed. Because we distribute the PDSL programs on the Newsletter every month, our members are able to keep up to date with the PDSL programs and, of course, it is very much more affable for contributions coming in. We have some excellent routines which range from dissertations to communications, file maintenance to utilities and we also have a patch to customize Synograph and use it with an IBM (or any size) column format.

Our membership fees will be £10 per year which will include the price of the first disk. Their members are asked to send in the disk by the 20th of the month for the next issue. We currently have three newsletters (2 disk issues) and the 3rd Newsletter will be due at the end of February. If anyone is interested in joining us, then they only have to send me some blank disks for copies of the Newsletter which will tell them

more about us than a single letter can (return postage would be appreciated).

I would like to thank Dragon User, the Systems Engineers dept of Motorola in Scotland, Ted Oprechal of Composites, Drew Coates of Microserve, Viewary, Teachmaster and all the members who have helped me in various ways, whilst I was starting the group.

Martin Vernon  
4 Roseberry Court  
Llandudno  
Gwynedd

## Transform

THERE SEEM to be thousands of Dragon users transformed into on-Dragon users by their transformers turning out. It is this happens this is what you should do:

1. Take your faulty transformer into a radio repair shop.
2. Tell them to open it up by drilling out the rivets. (This is usually where the repair people get reluctant, but remember, what have you got to lose?)
3. Let them replace the fuse that has blown, most often the 12V one; usually, the actual transformer is in a booming state!
4. Let them close the box with screws; the next repair will be as much easier!

DO IT by this yourself unless you're a professional. 140 volts is a killer. The whole job should take about half an hour and not cost more than £10.

PS: If anyone is looking for Swedish-Finnish word processing software or software to access and download from electronic mailboxes, contact me!

Martin Vernon  
Punahikantie 4 B 14  
SF — 00800  
Helsinki  
Finland

**MANY THANKS** for all the letters on the subject of transformers — the moral is that they can be repaired BY PROFESSIONAL, COMPETENT PEOPLE. The mailbag strongly advised against amateur meddling — a point that cannot be made strongly enough.

Of course, new or reconditioned transformers are now available from a number of sources — Batty and Peckoff to name but two.

## Wordproc Pokes

I HAVE had a couple of letters from people wishing to use my "Wordproc" program with a printer other than my Sakata GP100A. The alterations are moderately simple. Double = code for double width print. Single + = code for double width cancel or single width standard select.

POKE \$H1185, DOUBBLE  
POKE \$H1186, SINGLE  
POKE \$H118B, SINGLE  
POKE \$H11E2, SINGLE  
POKE \$H11E8, DOUBBLE  
POKE \$H11F7, DOUBBLE  
POKE \$H11F8, SINGLE

The codes for double and normal text can be entered using the "special characters" key as described in the article. Double spaced lines can be obtained by first loading the program, and then entering: POKE \$H14A2, POKE \$H14B, 13: POKE \$H14C, 13. This will send an extra line feed to the printer each time.

Peter Whitaker  
Cambridge

## Tip Time

THIS IS the first letter that I have written to Dragon Users to let me say what is great job you're doing keeping the Dragon 32-64 alive.

I have come across a routine of Pokes from Dragon World that might be of some use to the Dragon owners who have (or have access to) a printer. POKE \$H185, \$H80 (enter) POKE \$H185, \$H0F (enter) POKE \$H187, \$H7E (enter) To cancel the routine type POKE \$H187, \$H05 (enter). To re-start type POKE \$H187, \$H7E (enter). What this routine does is that everything that is typed to the screen is sent to the printer, (rather like a teletypewriter).

Also I am looking for a computer (see item) who would be interested in programming and also exchanging hints, pokes, programs, etc.

John Scullard  
12 The Mount  
Tegmouth

## More Tips

MY TIP is, if you are like me and messing with machine code sometimes the program goes wild and usually its DragonDex that gets the worst end of the stick. To get it back just run this little program.

```
10: CLEAR 500
20: FOR A=1 TO 10
30: SPREAD 1, 10, A, AS, BS
40: $WRITE, 20, A, AS, BS
50: NEXT
```

By R. Bailey (G4999)  
52 Pineside St  
Chase Terrace  
Bath  
WST 3JA

## Dragon to Dragon

BELLOW ARE some good ideas that can be used by Dragon users with modems. I'll let them with what I think are the best at the top and then in descending order.

Ring back (R/B) means that you dial the number and after it's rung once, you replace the receiver and dial again. When you get the carrier tone, turn your modem on and replace the receiver.

You must ensure that your modem is set in Originate Mode or else you'll get garbage on the screen.

All of the above numbers require your software to be set on "7 Bits No Parity 1 Stop Bit".

Ray Thomas  
40 Elm Grove  
Solihull  
Haverlockwood  
Dialled  
2402 572

Name	Number	Details
WADDS (300)	0800 520711	RING BACK, 24 HRS.
88500 (300)	0705 736825	R/B, WED & SAT 10PM-12PM, 12AM-10PM.
DAIR CRYSTAL TUG (300)	01 954 9647 021 444 1484	DRAGON 505 OS-9 24 HRS, (300 & 1200) 9AM-10PM, R/B, 10PM-5AM, NORMAL, 24 HRS.
SANCTUARY (300)		



# Dragon User People's Chart

This is what the Dragon world has been holding its breath for — the results of the first Dragon User People's Chart. The entries flooded in and the administrative minions were kept working long and hard until the results opposite were obtained.

Generally, the anagram attempts were of an amazingly high standard, but in the end we plumped for the solid but sincere, 'The Dragon is just great', from D. J. Post of Chislehampton, North Devon. Many congratulations to him, and his prize will be arriving in his wayward very soon. And so to next month ....

Each month we will be asking you to vote for your top five favourite programs on your Dragon (games, applications or utilities) and write them down in order of excellence on the form opposite (or copy it out if you don't want to damage your paper). And just for an extra incentive (as if you needed it), if you like you can construct a phrase or sentence using letters from the titles in your own top three — you don't have to use them all, just as many as you can. We will pick out our favourites, and he or she will be the recipient of £25-worth of software, donated by Microdeal. You can vote in the chart without making up an anagram, but you won't be in with a chance of winning a prize.

Send off your entry to: People's Chart, Dragon User, 10-13 Little Newport Street, London WC2H 9PP. Enter the People's Chart!

## Results February 1986

- 1 Shocktrooper..... (Microdeal)
- 2 Juxtaposition..... (Wintersoft)
- 3 Speed Racer..... (Microdeal)
- 4 Eddie Steady Go..... (Incentive)
- 5 Jet Set Willy..... (Software Projects)

## Chart Three

Voting for Chart No. 3 closes at 11pm on Friday 18th April 1986. Entries received after that time will not be eligible for inclusion in that month's voting. The editor's decision is final. Only one entry per individual per month will be allowed.

My top 5: Voting Month 3

- Name.....
- Address.....
- 1.....
- 2.....
- 3.....
- 4.....
- 5.....

My phrase is: .....

## WINTERSOFT PRESENT THEIR FIRST ADVENTURE WITH PANORAMIC GRAPHICS



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AN EXTENSION OF THE WINTERSOFT SYSTEM, THE BARONS OF CETIV is a strategy game.



For to Gull's Bay, the first of a series of three games planned by Wintersoft. They could be the best of both worlds: a combination of action and strategy.

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# Any Questions?

*Construct your own personal expert system with this program from the keyboard of Peter Wittaker*

IN THE Sylogy Expert program (Dragon User, March 1986) I demonstrated how the Dragon could be made to appear to understand English, and to draw conclusions from what it was told. However, interesting though that may be, it is not of much practical use in the real world. The program here presented is different, in that it has great potential use, the extent of which is only limited by the imagination of the user. For example, if your car broke down, it would be possible for the non-expert car mechanic to diagnose the fault in a matter of minutes using this program. The program would ask a series of questions, and depending on the answers given would be able to work out the fault. Similarly this program could help to diagnose an illness or to categorise an unrecognized animal.

## Binary

Start by entering and running Listing 1 'Datespurf'. This is a short expert system which will illustrate some of the principles and weaknesses of such systems. When run, it asks you to choose one of four possible causes for a car breakdown. Then it asks three relevant questions, and depending upon the answers makes its diagnosis. The program works by treating the series of answers given as a binary number (Yes = 1 No = 0), so that if three of the sequence of questions we have a three bit binary value. This value is compared with the values required for the four known solutions to the problem. If a match is found it is printed out, and the program returns to the start again.

This works quite well, and although the program does not have any insight ability to learn new solutions to the breakdown problem, it can be easily altered. If the questions are all answered 'Yes', the program will reply that it does not know what the problem is. Stop Line 230 to add "spotted drizzle" and change the loop in Line 180 from 4 to 5. The program will now come up with a solution to the situation. However, this is a very unsatisfactory solution, because it is difficult to expand the program's knowledge database. With three questions it can distinguish between eight different situations, but if we wish to add a ninth situation we must include an extra question. Doing this will change the answer values for all the other eight answers from three bit values to four bits and the database values will need to be recalculated.

This might not be too much trouble with three questions and eight situations, but by the time you have reached 10 questions

```
10 GOSUB INITSET "INITIAL EXPERT" : PRINT  
11 PRINT  
20 PRINT : PRINT "PLEASE CHOOSE A REASON  
DOWN FROM ONE OF THE FOLLOWING  
CATEGORIES: PRINT : PRINT "A FLAT BATTERY  
C. PRINT : PRINT "EMPTY PETROL TANK" : P  
B : PRINT "A BROKEN HEADLIGHT" : PRINT  
A BLOWN FUSE" : PRINT  
30 RESTORE  
40 ***** ASK QUESTIONS *****  
50 POWER = 0 : SUM = 0  
60 FOR A = 1 TO 3  
70 POWER = POWER * 2  
80 READ QUESTION : PRINT QUESTION : CL  
90 ANSWER = 0  
100 IF ANSWER = 1 THEN PRINT "YES" : SUM = SUM  
+ POWER : GOTO 130  
110 IF ANSWER = 0 THEN PRINT "NO" : GOTO 130  
120 GOTO 90  
130 NEXT A  
140 ***** FIND ANSWER *****  
150 FOR A = 1 TO 4  
160 READ ANSWER : ANSWER  
170 IF SUM = ANSWER THEN PRINT "THE AN  
SWER IS " : ANSWER : FOR A = 1 TO 3  
0 : NEXT A : GOTO 220  
180 NEXT A  
190 PRINT "I DO NOT KNOW WHAT THAT IS  
0" : FOR A = 1 TO 500 : NEXT A : GOTO 2  
200 ***** QUESTIONS *****  
210 DATA "DO THE LIGHTS WORK?", "DOES  
THE ENGINE RUN?", "DOES THE HORN  
WORK?"  
220 ***** ANSWERS *****  
230 DATA "FLAT BATTERY", 0, "EMPTY PET  
ROL TANK", 5, "BROKEN HEADLIGHT",  
6, "BLOWN FUSE", 2  
240 GO TO 1985 PETER WHITTAKER.
```

Listing 1

and over a thousand different situations the job gets out of hand. A second problem is that to find a solution, the program needs to ask all of the questions it knows, even if some of them are totally irrelevant. Added to this many of the possible answer combinations will never occur, so 10 questions might only distinguish between 20 actual solutions, and not the thousands possibilities. All of this makes the program very rigid, uninteresting to use, and removes all

chances of a short cut to the solution.

Listing 42, the 'Expert Learning System' overcomes these problems. Instead of relying upon right/dials for all the questions asked, it generates a tree of related questions and answers. This means that it will ask only the minimum of possible questions to arrive at a solution, and that it can very easily learn and expand its knowledge database. The program makes use of three data tables. The first,



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```

500 GOTO 505
505 IF ANSWER=1 THEN GOTO 508
505 IF ANSWER=2 THEN PRINT "YES"; GOTO 508
505 IF ANSWER=3 THEN PRINT "NO"; GOTO 507
505 GOTO 508
507 PRINT "FOR THE OUTCOME OF " & ANSWER
507 PRINT "WOULD YOU ANSWER"; GOTO 505
508 PRINT "YES"; IF ANSWER=1 THEN 508
508 IF ANSWER=2 THEN PRINT "YES"; GOTO 505
508 IF ANSWER=3 THEN PRINT "NO"; GOTO 502
508 GOTO 508
509 IF ANSWER THEN SOURCE.10; GOTO 509
509 IF ANSWER THEN ANSWY QUESTION.0
509 GOTO ANSWY QUESTION.1; GOTO 509
509 IF QUESTION TO ANSWER ANSWY
509 IF ANSWER THEN ANSWY QUESTION.1
509 GOTO ANSWY QUESTION.0; GOTO 509
509 GOTO 509
509 "DATA BASE DATABASE DATA
509 PRINT "ENTER FILE NAME"; FILE#
509 PRINT "INITIAL QUESTION#
509 R=1
509 PRINT "FILE# ANSWY R.0
509 PRINT "FILE# ANSWY R.1
509 PRINT "FILE# QUESTION# R.0
509 PRINT "FILE# ANSWY R.0
509 IF CORFILE#>0 THEN R=R+1; GOTO 509
509 CLOSE
509 QUESTION#
509 R=0
509 R=R+1; IF ANSWER R<1 THEN 509
509 PRINT "FILE# ANSWY R-1
509 GOTO 509
509 FOR R=1 TO 2000; NEXT R; RETURN
509 <<<< END BY PETER WILTONS.

```

Original Software for the Dragon by COMPUTERWARE



74.45

## BLOCKBUSTER GOES

Adrenal adaptation of the F.V. game outside for 2 players. The game contains a maximum 500 questions and answers covering a wide range of topics and varying in difficulty from easy to hard. Full-colour night-vision graphics are used to display the board from which a player makes his letter choices and also the second hand.

"Computers present the quiz in an efficient and compelling way." — *Director, Texas A&M*



1999

1000

The game is for 2 to 4 players, designed to be in form words on the board and thereby score points. The computer automatically calculates all moves including double and triple word squares, 50 bonus etc. The game features colorful graphics with facilities for connecting multiple sessions or downloading different letters from the pack.

"Linkword seems to be an excellent program, with much enjoyment to be had from it..." — *Dragon User*, May '84



100

120% moisture wick, full color high resolution graphics, big buttons, 3 colors, nine different courses, numerous laser styles, continuous sewing, lots of characters and lots of sewing the clock, machine sound effects.

"...a well written and thought out program" —Dragon  
Mag. December '85

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## COMPUTERWARE

1995. *How to Grow Service-as-a-Brand*. STG 4003.

Dear Computeware,  
I have this morning received  
my copy of Blockbuster Guide  
and am very pleased with it. I  
must praise your very prompt  
service. — well done.  
Paul Gardner  
Hickory

Dear Computerware,  
May I say how successful your  
"Linkword" program is. It has  
given our family hours of fun  
and interest — and I hope  
increased our vocabulary!  
Peter Joanne  
Ryle

### LINE AND NEGATION

THESE RESULTS WERE USED TO



# Getting in control

The new MXT controller opens up a new range of applications for your Dragon —  
Roy Coates checks it out

THE LATEST addition to CompuScene's armory of hardware for the Dragon is the MXT controller cartridge from Beam Electronics. The cartridge fits snugly into the Dragon's cartridge port and has integral legs to support the weight of the unit which is heavier than most cartridges owing to the weight of the relays that are housed within it.

The facilities offered by the cartridge include the ability to control up to four external devices (the controller is available in both 2 and 4 relay configurations) and to detect the condition of four input channels. A real-time clock is included in the package which enables the unit to be programmed to operate at set times which makes it suitable for many domestic applications such as heating control and lighting etc.

When the unit is plugged into the Dragon and the Dragon switched on, the program held on an EPROM within the cartridge automatically debits seven new commands to BASIC to enable the unit to be controlled

easily from a BASIC program. The new commands allow you to set the real-time clock, access the clock (for timing purposes), switch each of the relays either ON or OFF and determine the status of each of the four input channels.

The commands are:  
**CLOCKSET** — Which allows the real-time clock to be set to the current time.

**CLOCKONK** — Which displays the current setting held by the real-time clock.

**CLOCK** — Which allows a BASIC variable to assume the value held by the clock.

**SWITCHON** — Which allows one of the relays to be energised.

**SWITCHOFF** — Which will de-energise an active relay.

**SWITCHIN** — Which will return the status of a selected input port.

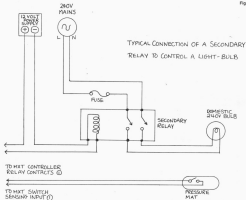
**MON** — Which activates the monitor program built into the cartridge.

The machine code monitor built into the MXT controller allows the assembler programmer to execute and de-bug his prog-

rams whilst the controller is present. The monitor is capable of examining and changing both the 6809's internal registers and user-specified memory locations, setting break-points to allow machine code program execution to be monitored at selected stores, execution of a machine code program itself, and finally a warm-start back to BASIC.

As with the added BASIC functions, the monitor commands are simple to use and easy to remember. The documentation supplied with the unit gives sufficient information on each of the new commands and some useful ideas and examples on how to implement them.

Care has obviously been taken in designing this unit for although the makers suggest that the clock should be accurate to within about two seconds a day, they give information on fine tuning the counters that control the clock itself. These counters are employed and the most sensitive of these will alter the clock rate by a mere 5.1





seconds a day!! (Apparently Dragon Data changed the main Crystal frequency in some of the earlier Dragons from 14.218MHz to 14.31818MHz, details for adjusting the clock to compensate for this are also given.)

Connections to the MXT unit are made by means of some very neat screwless terminals, these simply require a screwdriver to depress the spring-loaded assembly whilst the wire is inserted and this provides a secure connection to the cable.

## Relays

The relays used in this controller are rated up to a maximum of 3 Amps at 24 Volts DC and a maximum of 2 Amps at 240 Volts AC and it is worth mentioning that the manufacturer strongly recommend that mains voltage should not be switched by

the relays in the unit but by secondary external relays driven by passing a lower voltage through the relays of the MXT unit.

The MXT controller unit may be used for all sorts of applications from a simple burglar alarm system to the control of a model railway. A useful application would be the automatic switching on of a lounge light at a set time in the evening. (See Fig 10). The following program will switch a light on at 6pm (1800 hrs) and switch it off at 11pm (2300 hrs). The switching on of the lamp may be overridden by a pressure mat connected to input switch 1.

A bugler alarm circuit may be made up in such a way that all trigger switches are connected in series to one of the input sensors and the alarm bell triggered by a secondary relay driven from one of the MXT relays.

The uses to which this unit may be put are so varied that it would be impossible to list them all. It is well made and the price compares fairly with other such products on the micro-market. The software is simple to use and the unit appears to be quite reliable. The only reservation that I would have personally is that the power to drive a multiple relay operation may, in the long term, be too much for the Dragon's already weak power switch.

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```

10 REM PROGRAM TO SWITCH LIGHT ON AT 6PM AND OFF AT 11PM.
20 REM
30 REM
40 T=CLOCK(H)          : 'CHECK FOR 6PM.
50 IF T = 18 THEN 40     : 'IF NOT 6PM THEN TRY AGAIN.
60 IF SWITCHIN 1 = 0 THEN 40 : 'PRESSURE MAT OPERATED ??
60 SWITCHON 1           : 'ACTIVATE RELAY ONE.
70 REM NOW CHECK FOR 11PM TO TURN THE LIGHT OFF.
80 T=CLOCK(H)
90 IF T < 23 THEN 90     : 'NOT 11PM SO TRY AGAIN.
100 SWITCHOFF 1         : '11PM SO SWITCH RELAY ONE OFF.
110 END

```

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21837	3121391E8C864926C73586	=	353	22387	16FF13188C582426C8A55	=	343
21848	3436138D4E26188E518F86	=	383	22398	8881812611864E28018427	=	298
21859	8FC61D8D518FB6815A8128	=	471	22409	888932239426FA4FB75598	=	483
21870	2586188C582426884188E8	=	24F	22420	17FDF716FEDF8655868181	=	561
21881	51868F3888288D518F5FF7	=	461	22431	2611866E20818927968D52	=	327
21892	5584F7558388F4E26258643	=	3FA	22442	688A26FA4FB7558617F8D3	=	562
21903	36138E8E26188E518F868F	=	388	22453	16FED18635878181261186	=	666
21914	C6188D518FB6815A811822	=	482	22464	4E28818427968D55E8A426	=	380
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21936	868F3888E88D518F5FF788	=	543	22486	34368E4E2638878288A889	=	370
21947	84F755838F4E26258684FB7	=	477	22497	81862633A6888188262846	=	374
21958	4E288755838848874E2E8E	=	389	22508	8481882627884E26388889	=	410
21969	4E2884FA788A788A788D755	=	540	22519	6888818826188A688818826	=	385
21980	6C16FC853A368D881213C6	=	385	22530	1586848188268F8E4E2638	=	357
21991	8F86821CFED84E2638828D	=	3A2	22541	8F868F8A84858826823586	=	488
22002	3A881F8838881F8D33881F	=	289	22552	8848288188272988878E2E	=	388
22013	8D2E4A26C8884E26388889	=	410	22563	C61430C34C391F8888848E	=	368
22024	8F4E265A26DA3888F4E88F	=	523	22574	8888C61E88518417882817	=	38E
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22046	C888F78E28884E26381F8F	=	477	22596	81882688C881F78E23884E	=	3E7
22057	4E2635863A3686888E788	=	487	22607	26188E518F868FC6188D51	=	424
22068	388688884C317FED18E8A2C	=	5CF	22618	8F86818F7558835863A38F6	=	446
22079	888FC8181888518F8D518F	=	402	22629	4E28C184271786815A8180	=	318
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22101	26FA8E4E263888288F4E26	=	450	22651	888852335A26FA884E2618	=	3FA
22112	868FC618188E58248D518F	=	457	22662	888883C68F8688A3A78A38	=	628
22123	4FB75588864E26C61430C3	=	478	22673	88288A26F8888F8E21313F	=	465
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22167	84FF882888178288864E23	=	324	22717	818827828D7586FF4A78A8	=	480
22178	81811827FF1C8655898181	=	36A	22728	1F3A268F17881225188889	=	285
22189	288316FCE8884112818F18	=	38F	22739	88FFC8884FA78A381F5A26	=	412
22200	27FF88888128881588132	=	440	22750	FC85863A368DFC88A8887	=	56F
22211	18228888818C1825888986	=	28E	22761	FF3388888186F887FF288D	=	597
22222	815A818125A88138328814	=	238	22772	167FFF288D1138818C883F	=	34E
22233	FF8888812F75883F8584	=	598	22783	28888FF2884F787F2338	=	673
22244	C1812738F64E38C1842786	=	369	22794	861F12313F28FC38188E51	=	381
22255	8D558E8A26FA188E58248E	=	530	22805	85888FC6188D518F8D52CA	=	523
22266	4E26888FC6188D518FC841	=	488	22816	188E518F8D518FC84A417F8	=	520
22277	F7558A88522388818F7588	=	41A	22827	E15A26FA886588C887558C	=	486
22288	87588816FF738D8812F888	=	536	22838	2826343A68A88188261E8C	=	348
22299	83C1812724FF75848F64E	=	483	22849	185A2285888E7228C88C16	=	323
22310	2AC18427888852238A26FA	=	308	22860	2C22888E14A428888C18C1	=	383
22321	8E4E26148E5881868FC618	=	383	22871	25858E19C1288A25864F87	=	457
22332	8D518FC841F758838D558E	=	505	22882	528C8E4E268A788A788A78A	=	461
22343	C881F75886F7588716FF37	=	488	22893	86A8874E2E383888A8874E	=	388
22354	188C882426A286558588181	=	38A	22904	2E3838383838888E8E8F8E	=	489



## Heart of the matter

*This month Messrs Orbaum and Campbell reveal the joys of chip architecture and flowcharting in part two of our series on machine code.*

LAST MONTH we showed you a small glimpse of the world of assembler programming. Before we start programming, however, there are a few more things that form the basis of the programmer's world. Two in particular are processor architecture and flowcharting — in that order.

Processor architecture has nothing at all to do with Sir Christopher Wren, but there again it had very little to do with programming. It is, however, handy to keep in mind the way the processor deals with the instructions that it is obeying, as this way more efficient code can be written.

## Benefits

The diagram in Figure One shows the internal structure of the 68000, giving the relationships of all the registers and busses. The easiest way to think of a register is as another memory location. The same difference is that of speed — to access the contents of a register, the processor does not need to go outside the immediate environment. The registers all have different names, and are grouped together:

**PC — Program Counter.** Used to point to the next instruction to be executed, and therefore 16 bits wide. Very rarely is this used by programmers. Although it is possible to change the contents, the results are likely to control, and the desired result can usually be achieved in simpler and easier ways.

**System Stack Pointer.** A stack is a list of bytes, used for many purposes. The strategy of a stack of pointers is to be sequential in memory space, and is not sequential in use. As the stack pointer can be changed to access bytes out of sequence, the pointer contains the address of the next byte on the stack, and is updated whenever something is pushed to or popped from the stack. The system stack is used, as its name suggests, to store information for the system calls. As the stack can be placed anywhere in memory, this pointer is system call specific.

3. **Use Stack Pointer.** The 5806 is unusual among processors in that it has two stacks. The user stack is not used by the processor, and so it is safest to use the user stack for all your data, then if anything is left on the stack by a subroutine — normally fast when it comes to time to retrieve the return address — the program runs all right. On the other hand, if the process is followed, the first indication that something is wrong comes when the stack has grown far enough to overwrite something important. On the whole, use care.

ignore the user stack, but it can be useful on occasion.

**X and Y** — index registers. Like all processors, the 68000 has several index registers, for use in accessing memory. Unlike most, both indices on the 68000 can access the entire range of addressable memory — all 64k, if fitted. This is because they are 16 bit registers. They are used as an offset for accessing, for example, tables of data, but they have many other uses, as you should know by now.

**DP—The Direct Page Register.** Memory is divided, nominally, into pages of 256 bytes. For speed, it is possible to specify which page operations are going to occur in, and then to have the address as an eight-bit offset within this page. This is only really useful if there are going to be a large number of sequential operations within a page.

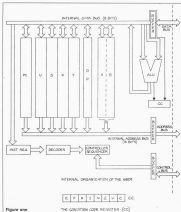
**Byte arrays** — For example, sorting is much easier with arrays.

**C — The Accumulator.** The 8009 is also unusual in that it has a 16 bit accumulator. This is the register that is used by most of the arithmetic functions. It can also be used as two eight bit registers, A and B, for functions not involving 256.

**CC — The Condition Code Register.** This is best thought of as eight separate bits, as they are rarely accessed as a byte. Each bit serves a different function, and is used as a flag to show whether or not an event has occurred. We will deal with these separately as we come to them.

Many of these explanations will only become clear when addressing modes are covered at a later date.

The ALL is the American Legion Unit, and consists of 100 members. It meets every two weeks.





tion, subtraction, and, surprisingly, multiplication, a function that normally needs implanting in software.

The data and address busses are both used for communication between various parts of the chip, and, through a buffer, with devices such as memory chips.

The controller sequencer is the bit that controls all the registers and the ALU, with help from the instruction register and the decoder.

Now on to a subject that has made grown men weep, and is widely ignored by

programmers, analysts, consultants, and bus-drivers, despite its relative importance. Yes, its flowcharting! Many people think this is only of use for very large programs, but with a language like assembler, where there are a large number of lines of code, it is often very easy to lose track of the overall direction of the program, when concentrating on a few lines at a time. Then a flowchart comes in handy. There are a multitude of symbols, courtesy of the boys of the ISO, but of these, only three are of any use — Process, Decision, and Start/Stop.

The basic principles of flowcharting are very simple. The most important thing is to be able to look at whatever is being coded as a whole, then break it down into manageable chunks in logical sequence. What a manageable size is depends on many things, including the size of the whole task, the programmer, the size of the finished flowchart.

The only guide it is possible to give is to say that the flowchart itself should not get out of hand.

The symbols are as follows:

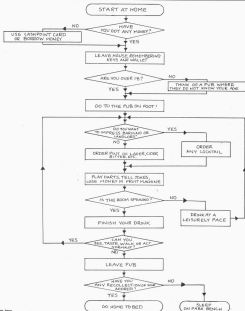
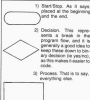


Figure two





Figures Two and Three are two flowcharts we draw up as an example. The first, not totally serious, has nothing at all to do with programming (except in that it represents a process not totally unfamiliar to most programmers!), but should serve as a general example. The second is a flowchart for a program we will publish next month, to clear the screen in a slightly different way, store on that later after a closer look at Figure Two.

## Flowcharting

The first thing you will notice about the flowchart is that it is very easy to follow. This is one of the fundamental advantages to flowcharting a program. It is very difficult to get lost in the programming provided you have an adequate flowchart tool to give.

We say adequate because we have seen someone try to write a Defender program from a flowchart with six boxes, which were "Show Instructions", "Initialise", "Play Game", "Man Dead? (Y/N)", "Print Game Over", and "Another Game? (Y/N)". This flowchart, as one can imagine, is of little use to anyone.

The thinking flowchart contains six decisions, ten processes, a start, and two alternative endings. All lines are arrowed (some more than once), all junctions have arrows on all lines entering/joining as near to the junction as possible without causing confusion. All decision boxes have their exits clearly marked Yes and No.

All these things should be present on every flowchart, although on a code flowchart the start and end boxes should contain the words START and END respectively and exclusively. Study the first flowchart, understand it and its use, then go on to Figure Three. Look at it and try to understand it before reading on for the explanation.

Right, all those who didn't even glance at the diagram go back and do it again. Done that? Good. Now, the flowchart is very simple, having two loops, but it may aid understanding to realise that the Dragon text screen starts at location 1024 and ends at location 1808. All the routine does is to point to a position along each line (initially at the right hand end), store the address of that position in X (in this case the X register) and then use that as an offset to store a green square on screen. The pointer is then

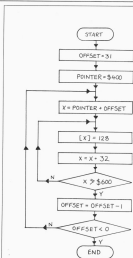


Figure three

moved onto the next line, by adding 32, and the register is checked to ensure we have not reached the end of the screen. If we have, the position is reduced by one, and, if we have not reached the end of the line, the process is repeated.

## Glossary

Try to extend the flowchart so that it covers the screen in black that way, and then does the same in the opposite direction, in green. We will present a program next month that does so.

For now here are this month's additions to the Glossary of machine code terms.

**Accumulator** — A register within which most of the mathematical functions are performed within an machine code program.

**FILE** — First In Last Out.

**Flowchart** — A diagram designed to ease programming of part or all of a program. The flowchart consists of a series of standard symbols combined in a manner that makes them easily understood.

**LILO** — Last In Last Out.

**Register** — In crude terms, a faster "variable" within the computer. A set of eight or 16 bits (defining a register as a one or two byte register) used for the manipulation of data within memory.

**Stack** — A pile of numbers! A stack works on a FILO principle, ie, the top number on the stack will be the one put there most recently.

Join us next month for the first piece of actual code.







# Dragonsoft

New software for review should be sent to Dragon User, 12-13 Little Newport Street, London WC2H 7PP.

## Cop it!

**Program:** *Cops'n Snatch*.  
**Blazy Software, Crossways House, Lutonworth Road, Blazy, Leicestershire.**  
**Price:** £3.99

A few days ago I sat at my keyboard and said "Right, it's time to write this month's review. Perhaps before I do it though, I'll have a quick game of *Cops'n Snatch* just to wake me up!" By about one in the morning, into my millionth game of *Cops'n Snatch* for that evening I was in no state to write my name, let alone a review of this superb game.

Strangely enough, the same thing happened the day before yesterday. I sat down, decided to have a quick go at this game, which, incidentally involves

flying a helicopter "Scramble" like for to be more accurate, "Super Cobra" like, over a terrain defended by guns, laser turrets, force fields, etc, in an effort to reach the enemy's plane, and suddenly found it was some ungodly hour near dawn. The reviews still remained unwritten.

Yesterday, I sat down, loaded up the game with the best of intentions, played its Mode 24 flicker-free graphics for several hours and completely forgot all my cases and my deadline, being carried away as I was in the crystal sound and smooth movement, and speed.

It is surprising, therefore, that after so much play, I should only have been tonight, after two and a half hours of hammering on the keyboard instead of using my joystick because, you see, the sheer



speed of the game makes joystick control very difficult. I eventually got past the first fence field and into the next stage of the game — a cave rather than just a landscape with more defenses, into which I managed to probe about three millimetres!

It's now five to eleven at

night, the deadline is the day after tomorrow. I'd better get someone to hide *Cops'n Snatch* now, thinking of which, I don't half fancy a game. No, no, I mustn't! ... Oh heck! What's a deadline anyway?

Jason Orsbaum



## Rock steady

**Program:** *Dragonian*. Micro-  
**code, 41 Tread Road, St Austell, Cornwall, PL25 5UE.**  
**Price:** £3.70 (inc P&H)

FOR MY second rave this month I have picked an Micro-code's *Dragonian* which is a brilliant, inspired cross between *Smilear*, *Tetris-Art*, and *Time Pilot* that routines as an original and addictive game in its own right.

The game puts you in charge of a space ship which remains centre screen as the play field moves around it in the opposite direction to that in which you are pointing (a la *Tetris-Art* and *Time Pilot* and *Smilear*). The idea is to free all humans within the galaxy. Each is held within an enemy base shown on the radar. A base consists of three or more force-fields enclosing one or more space people. The force fields are linked by generators and it is these which must be destroyed to remove the base.

Also in the galaxy, just to make things harder, are space mines, which, once shot, impede for a couple of seconds making it very easy to fly into their explosions which are as fatal to your ship as the mines themselves. The mines are accompanied by space rocks

which are really pretty feeble and easy to destroy — this makes it even more annoying when one is flown into!

Also in the galaxy, just to make things even harder, are *Dragonians*, which chase you and attempt to kill you in the traditional Japanese style (*Kamikaze*). It only takes one shot to cause a *Dragonian* to wing out but they return with all due haste.

The last enemy is the *Dragonian* himself, so big, and so terrifying that he even shows up on the radar! He doesn't appear until quite late, at which point it is a good idea to get off the screen, providing you've rescued all the space people that is! When he does appear on the screen though, (and calculation dictates that he's wing span is about ten of your ships ... and that's one wing, and he's indestructible), most people just drop the joystick and their bottom give simultaneously and watch their ship vaporise on his hull leaving not a scratch.

What can I say, the graphics are stunning, the game plays at a comfortable speed which I initially thought was too slow, but is in fact just right, and the title page is almost worth the money for the game anyway!

I have yet to finish section three by which point the generators are shooting back! but I will ... I will ...

Jason Orsbaum



## Freaky Fables

**Program:** *Zak's Son*. Cable  
**via Computer, 27 Coombe Road, Southminster, Essex, CM2 7AH.**  
**Price:** £2.99

ONCE upon a time, there was a happy, happy land, where *Dragon Daks* still existed, where all the people were friendly and full of goodness and smiled even when it was raining and where the people were so primitive they still thought that *Pinkies* was a good game. And all day long these happy, happy folk, sang jolly songs about life, love, and the legend of the dragon.

But also there dwelt in the land of Evil Wizard and he began to spread rumours that there was a land far away across the water where there was a machine with really good games called the Spectrum. For lo, there were no Spectrums in this happy, happy land. And then, the Evil Wizard turned his wicked hands, and *Dragon Daks* went bust and lo, all the people did panic and scream and try to sell their *Dragon* through the pages of the scroll known as "Freaky Compiling Weekly".

But all was not lost in the land for there also existed the Good Witch *Cablette* who had

heard that one of these games for the Spectrum was a version of the arcade game mentioned in the legends of the elders called *Zaxxon* and lo, she said "Let there be *Zak's Son* so that all the little folk of the land can once more dance and sing and do all these happy sorts of things."

Word of her goodness had, however, reached the Evil Wizard and so he was filled with wrath and he decided not to stop this spell of good, but to alter it, for lo, he was as cunning as he was evil, and that's pretty cunning, and so he did speak these words ... "Yes, let there be *Zak's Son*, but let it be boring, slow, and generally disappointing."

And so, throughout the land advents did appear on trees for *Zak's Son* and once more the people did dance and sing and sell off for their copies and behold, on the day after they had begun getting up early to meet the post it did arrive on their doorsteps (for *God's Law* was still present in the happy happy land even if *Smilear* were not). And so, the people did load the game into their *Dragonians*, and lo, and it was not good.

And you verify the moral is ... Those who bring out really unimaginative arcade copies deserve to receive critical reviews.

Jason Orsbaum







# of the hill!

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## Over Loading

PLEASE could you tell me if it is possible to load a graphics screen into another graphics screen leaving the first screen graphics on, but under the second screen, if you could help I would be most grateful.

*Suzanne Chambers  
30 Park Avenue  
South Shields  
Type 4 Star*



THE SIMPLEST method of loading one screen 'over' another, without resorting to machine code, is to use a program such as the one shown below. Basically, this loads one picture into the first four graphics pages, and the second into the next four pages. The 'GET' command is used to take a section of the picture from the second screen and store it in the array 'B'.

The 'PUT' command is then used to overlay this on to the picture on the first screen.

This method works fine in the two colour modes, but for four colour modes change the 'AND' in line 70 to 'OR'. The areas where colours overlap will give interesting effects.

```
10 PCLAR 0
20 PWORD 4,1:COLSLEN 1,1
30 COLAR 0,1:POLE
40 CLOAR "PICTURE1", 0:RM
50 Load picture -- Saved by the
   CLAR "PICTURE1", 1000,
   700, 0 command
60 PWORD 4,1
70 CLOAR "PICTURE2", 0:RM
80 Load picture -- Saved by the
   CLAR "PICTURE2", 0:RM,
   1000, 0, 0
90 GOTO 80
```

gen. I need to know where to place the code of the received character so that the Dragon thinks it is an input from its own keyboard, and also how to copy the output to the screen to the terminal. (Hope you can help.

*D. Pendleton  
102 Marney Road  
West Just  
Woking  
Cheshire WA6 0J1*

IT SHOULD certainly be possible to use a Dragon from a remote terminal (for text) or only of course. One method is to patch the outputs at 362 and 369 which are the links for character input and output respectively. These are normally initialised to RTS instructions. See the Firmware page in 04 1165 and 036 for details of how to patch these routines.

## Multi Channel

FOR A while now I have been struggling with multi-channel sound output, (eg, Composr, via my Dragon's D/A converter). Although I can quite easily produce sound through one channel, I can find my way of outputting through more than this. Could you please help me with this problem?

*Adam Lee  
24 Fernington Road  
Reculver  
Cheltenham  
Gloucestershire GL51 6AF*

A POINT much made by Dragon-bashers is the mixer's sound capabilities (or lack of them). The Dragon has only one hardware sound channel (not counting single bit sound) which is accessed via the D/A converter. Programs such as Mic-

rosoft's 'Composr' use a software technique involving producing mixed waveforms from the D/A — each 'channel' has a different waveform. The sound still only comes from one channel but appears to be in more than one voice.

The techniques involved are quite complex and the simplest solution is to buy a copy of 'Composr' which, after all, will produce stand-alone machine code.

## Type Writing

PLEASE could you tell me if there is a way of getting whatever is produced on the screen, also produced on the printer, without having to edit it — i.e. in every print command. For example, the simple program below.

```
10 PRINT "DRAGON 32"
20 GOTO 10
```

I am asking this because at school I am taking a computer studies course, where I have to produce five programs written in BASIC, in the period of two years. But the program has to be produced as a listing and also as a RUN copy on the printer.

Could you tell me how to know whether there is a solution to my problem.

*Neil Peat  
12 Newton Close  
Leyland  
Lancs. PR9 3JZ*

THE FOLLOWING short listing can be run prior to loading your programs, or added to the start of any program. It causes a character sent to the screen to be echoed to the printer as well as the screen. You can still send characters to the printer only, by using PRINT

— 2 as normal. The program can be obtained by typing POKB 369,37

```
10 CLEAR 256,32768
20 FOR I=0 TO 2:READ A:POKE 32768+I,A:NEXT I
30 DATA 10,101,30,1,57,150,180,30
40 POKB 256,128:POKB 369,127:POKE 361,184
```

## Making Contact

I OWN two Dragon 84s which I have linked together via the RS 232 ports in the following way: Pin 1 to 1, Pin 2 to 8, Pin 3 to 3, Pin 4 to 5, Pin 5 to 4, Pin 6 to 2, and Pin 7 to 7.

Fairly could you let me know if these are correct, and, secondly could you please tell me how to send programs and data from one computer to the other as the DLOAD command only sets one computer to receive. I have tried the small programs given in the Dragon 154 supplement with no success.

*Mr. P. C. Kinnear  
4 Marrow Road  
George Green  
Sheff  
S12 6RD*

A SATISFIED head for connecting two 84s together can be made by connecting the pins in the following way: Pin 1 to 1, Pin 2 to 8, Pin 3 to 3, Pin 4 to 5, Pin 5 to 4, Pin 6 to 2, Pin 7 to 7.

The problem with the DLOAD command is, as you have found, there is no equivalent CLOAD command. The format required is not simple and in general it is best to avoid trying to use it. With a head made up as suggested above, the example programs in the supplement should work and can form the basis of a more sophisticated communications program.

## Remote Control

I AM trying to write a machine code program to enable my Dragon 32 to be run entirely from a ROM/ROM terminal. The terminal has a 80 x 24 display and I would like to take advantage of this.

I have a Mitigan RS232C port and have run a small program from basic to check that the terminal will communicate with my Ori-

## Whoops!

FINALLY, I have received a number of letters regarding my answer to John Booth in 03 Jan '86. Many of you noticed my gaffe in using the variable P8 to hold the disc filename, this should have course read P6 as P8 is a reserved word in Dragon basic and so its use as part of a variable name will cause a syntax error — sorry!





LET'S DEAL with some readers' letters first, before going on to some news which I know will interest lots of people who have written in to me in the past.

First out of the lucky dip is G Degree of 11 Sturdy Street, London E14 8GB, who offers help to anyone stuck in *Trekboer* and *Juxtaposition*, but in return needs a favour himself. ... or possibly herself. DO has taught one of the Phoenix twin-pack games, where you have to discover a code from playing an arcade game before being allowed to play the adventure on the second tape. I never liked this approach, and DO has been unable to get through the arcade game, leaving an unsatisfiable adventure. The pack was called *The Emperor Must Die*, so can any of you code-crackers or arcade addicts out there come to the rescue?

## Operation Safras

Plenty of you have completed *Petiprew's Diary*, but as yet no one has claimed to have got through the second part, *Operation Safras*. "After answering all the questions on the note given to you by Rhythma," says Justin Field, "what is the code you have to be 'pooosed'?" Any help to me or to Justin at 2 Barnet Green, Hatfield, Hertfordshire, South Yorks DN9 4HL.

Help of a slightly different kind is needed by S J Garfield, 38 Plasstone Avenue, Hedge Hill, Birmingham B36 5HQ. It may well be psychiatric help, as the Garfield household thinks the *Adventure Trail* should be five pages long every month, but their real problem lies with *Franklin's Tomb*. The *SAVE* facility on their copy causes the program to crash, which I haven't heard anyone mention before. Has any reader encountered the same problem and found a way round it? Or maybe you've finished the game and would like to pass a copy on. The Garfields will manage to amuse themselves in the meantime as they're stuck in *El Clabera*, but who isn't? How to get to the cave in the cliff, and how to get the feather from the eagle they ask. Well, to rewrite my favourite *Everly Brothers* song *MAER DRO COTE VAKUD YLLA*.

To prove that adventure playing can definitely be a family activity, just consider the Higgins home in Boodle, Merseyside. Philip's asking about *Petiprew*, Franklin and El Clabera, while his brother is stuck in *Wings of War* and Dad has shown who's in

charge by just completing *Return of the Ring*. He found a bug in the program, as after managing to kill Orin, the program crashed whenever he tried to enter a village. Could be Orin's revenge, I suppose, being dead out by his brother. Grrr. Anyway, Higgins senior's advice is to tell Orin and take your gear to the Chamber of Time to get into the final stages which is a mini-adventure with "brilliant graphics."

*Juxtaposition* is the adventure that's dominating the postbag at the moment, not surprisingly, with satisfied customers galore — (both those who've solved it and those who are struggling but still-enjoying it. You'll probably know already from *Dragon User's* news pages that the sequel might be ready by Easter. Maybe Dean Douglas of Blackburn will have crossed the Blue Mountains by then. The way through is in the Brown Lands: TRAH SAWW COFFE with ATR. A hint on the game from Frederick Jaxwell at Banbury, who's solved that and *Trekboer*, both of which he thought were excellent, though he says *Trekboer* didn't have as much behind it as he expected. Anyway, in *Juxtaposition* Frederick says that while you're outside the White City (I thought that was a dog track), you should enter any building you can as you might find something interesting.

## Franklin

Carl Twest is trying to find something interesting, and that's a copy of *Palamander* in *Wonderland*. You may recall that *Palamander* released a version of this without inlay and instructions for a liver, but now it seems to have disappeared from the market, as indeed does *Palamander*. *Wonderland* are selling some of the former *Palamander* titles but not this one. Anyone with a spare, contact Carl at 11 Hayden Road, Rushden, Northants NN10 0HX.

Stephen Cogan at 874 King Lane, Alcester, Leeds LS17 7AP is keen on hearing from *Dragon* owners in the Leeds area, particularly adventure players, to see about setting up a club of some kind, so contact Stephen if you're interested.

I'd like to remind readers to enclose their address when writing, which M D Waller didn't, so his offer of help to people on several adventures is rather difficult to pass on. So was the answer to his question (a common one they ask) about getting past the

Highways Droid in *Juxtaposition*. You need a flash of inspiration on that one.

Help on *Juxtaposition* is available from Gareth and Gersam Edwards, and you don't need to be an adventurer to work out where they live. The address is 10 Harleah Court, Henderderry, Caernarfon, Mid Glamorgan CF8 2TR. The brothers Edward say they'll advance saved games to a desired position if you like, or just help on any particular problem, provided you enclose one, which of course applies when writing to anyone who's kind enough to offer help to other readers. Gareth and Gersam completed the game in 10 days, and two of those were spent trying to solve the puzzle of the caretaker, which I would have thought was one of the easiest of the lot, so it goes to show how different puzzles do for different people.

If you're faced in *Ring of Darkness* then something from Garick Alder. He says that if you're thinking of buying a raft to go to the island, wait till you can afford to buy two, then put one on each shore in case you die and are reincarnated on the opposite side from where you left the raft. That's if you can't afford a flowercat. Garick also recommends the coward's way out in trying to deal with the monsters in the dungeons — break into the program and edit their strength to zero! Have my readers no shame?

More honest advice on *Return of the Ring* comes from Jonathan Harrop of Wintago, who says that at the start you must continually kill monsters to gain experience and raise your Garick Level, which causes the shops to sell more equipment, including the passes that you need. Also try trading with the monsters in the Forest Moor, as some of them give crystals away for nothing.

A couple of months ago I reviewed an adventure called *Castle Blackstar* and rated it very highly indeed. A little gem in the mine, what publishers SCR Adventures have asked me to mention, and that's that the disc version is only available for the SAS Dragon, and not to its little brother. It's good to know that at least one reader shares my enthusiasm for *Castle Blackstar*, and that's Pauline Hampton of 10 Cherry Lane, Laxton Heath, Alcester, Stoke-on-Trent ST17 3QZ. Pauline's completed lots of adventures, so knows what she's talking about, and she says the SCR effort "really







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## Dragonodos Firmware Memory Map

The Firmware data locations detailed below may be used for other purposes by the Basic ROM when Dragonodos is not installed, for example the USR routines table. Dragonodos also uses RAM from 1536 to 3071, moving graphics page one to address 3072.

- 394** Floppy Disk Controller Macro Command Byte. This is the byte sent to the hardware to specify what operation is to be performed. See Manufacturers data sheet for details.
- 395** Disk Drive number (1-4). The drive to be used in a sector read/write operation.
- 398** Disk Read/Write TRACK.
- 397** Disk Read/Write SECTOR.
- 398-399** Disk Read/Write sector Buffer address. This is a 256 byte area of memory from where the sector is to be written, or to where the sector is to be loaded.
- 340** Floppy Disk Controller Header Status Byte. This is the error number returned by the hardware to be converted into a Dragonodos error code.
- 341** Current File Number. The number of file (1-10) most recently accessed.
- 344** Number of disk drive sides and tracks for current drive. Coding is as follows:  
 00 = 1 side, 40 tracks  
 01 = 2 sides, 40 tracks  
 10 = 1 side, 80 tracks  
 11 = 2 sides, 80 tracks  
 The format of a disk is taken from the directory track on the first access to a disk after switch on or reset.
- 345** File Read/Write Flag. A zero value specifies a file read operation, non-zero specifies file write.
- 348** Disk I/O in progress flag. A non-zero value signals that disk I/O is continuing and that the motor should not be turned off by the IRQ routine.
- 1041** Interrupt countdown to disk motor off. The Dragonodos IRQ routine is used to decrement this location if it is not already zero. When it reaches zero the disk motor is switched off.
- 1044** Disk Auto-Verify on/off flag. A non-zero value causes the disk to be read after a write to verify that the data has been saved correctly. A zero value disables this feature. The default setting is On.
- 1046** Current default disk drive number (24PFD). This is the drive to be used by operations which do not specify a particular drive number. It is set from basic by

- the DRIVE command.
- 1540-50** AUTO command line number. The current line number being used by the AUTO command.
- 1551-52** AUTO command increment value.
- 1553** Program LOAD/RUN flag. A zero value indicates that the program is to be loaded, a non-zero value indicates that the program is to be loaded and RUN.
- 1555** AUTO command on/off flag. A non-zero value indicates that the AUTO command is being used.
- 1556** ERROR command on/off flag. A non-zero value indicates that the ERROR GOTO trap is active and errors will not cause the program to stop.
- 1557-58** ERROR trap line number. The Basic line number of the error routine.
- 1559-60** Line number of last error (EPL).
- 1561** Error code of last Basic error (EPR).
- 1565-69** Start address of program loaded.
- 1569-70** Length of program loaded.
- 1572-73** Entry address of program loaded (for machine code programs).
- 1587-88** USR routines address table. The addresses for the 10 USR routines are stored here when Dragonodos is installed.
- 1587-1790** Drive table: 4 bytes per parameter — 1 per drive.
- 1587-59** Online flag. A non-zero value indicates that the drive is online and has been accessed.
- 1591-94** Drive Current Track. If the drive is online, this byte specifies which track the head is currently over.
- 1595-98** Head stepping rate. This should only be changed if slower drives are used.
- 1793-95** Disk sectors per track. The number of sectors per track on the disk in the drive.
- 1795** File IDCB's. 10 (one per open file) each 31 bytes long.
- 2046** 1024 bytes of Disk File Sector Buffers — 256 bytes each.

## Dragonodos Hardware Locations

- The Floppy Disk Controller used in the Dragonodos interface is a WD 2797. The following hex locations are used by the 2797:
- FF40** Macro command/Drive status Register.
- FF41** Track Register.
- FF42** Sector Register.
- FF43** Data Register.
- The disk motors are controlled by location FF46. A zero value turns off the motors. A non-zero value switches on the motors and selects the particular drive.

## Dragonodos Firmware Routines

The following ROM routines may be used by the machine code programmer. All addresses are in decimal and obviously apply only when Dragonodos is installed.

**WriteSector** Dragonodos-2805  
 Writes a sector (256 bytes) out to disk. The locations 235 to 238 must be set up correctly as detailed above on entry. The Z condition code will be clear (ZPE) if an error has occurred and the B register will contain the error code.

**ReadSector** Dragonodos-40412  
 Reads a sector (256 bytes) from disk. The locations 235 to 238 must be set up correctly as detailed above on entry. Again the Z code will be clear if an error has occurred with the B register containing the code.

**Drive Init** Dragonodos-08059  
 Initialises the DCS hardware. On return the status register at 3FF40 will have the following meaning: Bit 1 = Index Input; Bit 5 = Write Protect status.

**HardwareID** Dragonodos-49513  
 Vector at 49175

this is a very low-level routine used by Dragonodos to send commands to the hardware. The routines used by the sector read/write routines. A knowledge of the hardware is required to use this routine. The command byte must be set up in location 234.

**Format Disk** Dragonodos-50106  
 Formats the disk in 24PFD drive. All data on this disk will be lost, an empty directory will also be set up on the newly formatted disk.

**Get Free Space** Dragonodos-52581  
 Vector at 49154

Returns the amount of free space (in bytes) on the current drive (DEPD) in the Floating Point Accumulator.

**Convert Sector** Dragonodos-54033  
 On entry the Y register should contain the logical sector number which is to be converted into a physical track and sector number in locations 235/237. Logical Sectors start at number 0 at track 0, sector 1.

**DirectoryDisk** Dragonodos-55666  
 Produces a directory of the disk in DEPD to the device number in DEVN (location 111), including protection status and free bytes.

**Beep** Dragonodos-56259  
 On entry the B register should contain the number of 'beeps' to be output. The beep sound is that produced by the Basic 825P command.

**Boot Disk** Dragonodos-56330  
 Boots an OS of the disk in DEPD. If the disk is not a valid operating system disk (see below) then a BT error is produced, otherwise the OS boot up program is loaded and entered at location 9730. In either case this routine does not return.

**Wait Time** Dragonodos-56267  
 On entry the X register should contain the number of milliseconds for the routine to wait before returning. The Break Key is also scanned for.







# Competition Corner

## Taking chances

Answers to Competition Corner,  
Dragon User, 12-13 Little Newport  
Street, London EC2M 2PP.



IT HAS been said that in no other branch of mathematics is it so easy to blunder as in probability theory, a statement which latter experience often bears out.

In fact, the probability that a certain event will occur is the number of favourable cases, divided by Total number of equally likely cases. Similarly, the probability that the event will not occur will be the number of unfavourable cases divided by Total number of equally likely cases.

For example, the probability of drawing at random, say, a diamond from a fullpack will be  $\frac{13}{52}$ , or 0.25, and the probability against will be  $\frac{39}{52}$ , or 0.75. Note that the sum of these two probabilities is 1, so from the definitions a probability of 1 means certainty and a probability of 0 means impossibility.

Difficulty in calculating probability often occurs when a number of factors are combined, and these fall into two main groups: (a) the probability of either this or that occurring, or (b) The probability of both this, and that occurring. To take the first instance, we have seen how the probability of drawing a diamond is assessed at .25. Suppose that we wish to calculate the probability of drawing either a diamond or a picture card. The temptation is to add the odds for drawing a diamond ( $\frac{13}{52}$ ), to the odds for drawing a picture ( $\frac{12}{52}$ ). This would give the total probability of  $\frac{25}{52}$ , which would be incorrect! Here we have counted twice those cards that are both diamonds and pictures. What we need to find is the probability of drawing either a diamond, a club picture, a heart picture, and a spade picture. This is given by  $\frac{13}{52} + \frac{12}{52} + \frac{12}{52} + \frac{12}{52} = \frac{49}{52}$ . To find the probability against simply subtract this value from 1.

The second of our main groups relates to cases where we wish to assess the probability that both this and that will occur. To take our card-drawing example we might

wish to calculate the probability of drawing a card which is both a diamond and a picture. In this case we simply multiply the probability of picking a diamond ( $\frac{13}{52}$ ) by the probability of picking a picture ( $\frac{12}{52}$ ). The product,  $\frac{156}{2704}$ , gives the answer that we would expect as there are three diamond picture cards in the pack of fifty-two cards. Once again, to find the probability against, simply subtract from 1.

In some problems it is easier to calculate the probability against an event, and subtract this from 1 to find the probability for the event. For example, if I throw six ordinary dice, what is the probability that I will throw at least one six? Since the probability against throwing a six with one die is  $\frac{5}{6}$ , the probability against throwing a single six with six dice will be:  $\frac{5}{6} \times \frac{5}{6} \times \frac{5}{6} \times \frac{5}{6} \times \frac{5}{6} \times \frac{5}{6}$ . This value to 3 decimal places works out at 0.334, and so the probability for throwing at least one six would be 1 minus 0.334, that is 0.666.

Before turning to this month's competition question, here is a little problem whose solution I shall give next month. It is a problem which is set in such a way as to mislead the solver in assessing the probabilities involved. You are invited to attend to participate in a small bet. He shows you three boxes of identical appearance. In the first box are two red marbles, in the second box two white marbles, and in the third are one of each colour. The boxes are closed and are mixed up. You are then invited to choose one of the boxes, and without looking inside, remove one of the marbles. Suppose that it is red, your friend might say "Obviously, the box that you have chosen is not the one containing the two white marbles so therefore I must be either the red/one or the red/white box. The remaining marble has an equal chance of being red or white. I propose to guess which colour it is, and offer you an odds money bet on the

outcome. If I am correct, I win, if I am wrong, I lose! Would you be able to accept the bet?

For this month's competition, as a demonstration in probabilities, I assembled a number of volunteers into a room and handed to each one of them a slip of paper. They were then asked to write down any year in the range 1 to 1999 inclusive. This was to be done secretly without consultation with the others present. The papers were then collected. I knew from the number of volunteers present that there was a slightly less than even chance of any two numbers being the same, but that if I also wrote down a date and added it to the pile the probability would rise to a better than even chance. In other words, the addition of one extra number would increase the probability of at least two dates coinciding from just under 0.5 to just over this value.

Can you say how many volunteers there were? As a clue, there are fewer than you might, at first sight, think!

### Prize

For this month, we are offering 15 prizes of the newest game for the Dragon... from the newest software house, Bean-stalker from Micro Vision. In this 30 screen arcade adventure, you must collect treasure in Giantland, avoiding such hazards as giant caterpillars, giant insects and man-sized birds. You've seen the parodies, now play the game!

### Rules

To win your own copy of Bean Stalker, all you have to do is put your brain into gear and work out the answer to this month's puzzle — showing how you solved it. But please don't send us answers containing your program — hard copies only.

Make sure that your name and address

is clearly printed on your entry, and mark your envelope "April Competition" ... or you might risk disqualification.

As a tie breaker, complete the following sentence in 18 words or less: "I want to visit Giantland because...". As usual, preference will be given to entries that make the editorial staff giggle.

### January winners

The 26 lucky winners of the Melbourne House "Enter the Dragon" contest are as follows: Mark Lister of Lymington, West Yorkshire; R. G. Woods of Ilford, Essex; Charles Daly of Windsor Hill, Co. Cork; Simon Aubrey of Swinton, Wills; G. R. Barber of Sutton Coldfield, West Midlands; P. D. Matthews of Tipton, Berks; M. Clarkson of Chesham, Essex.

Chris Jolly of Grove Park, London; K. Lightowler of Halifax; G. R. Sharpe of Macclesfield; Luis Martinez of San Sebastian, Spain; Stephen Hunter of Highfield, Southampton; B. A. Newman of Addlestone, Surrey; J. Taylor of Aylesham, Middlesex; P. L. Bates of St Albans; Cayana Simon of Biele, France; D. C. Faulstich of Macclesfield; Mid Glamorgan; Geoffrey Marshall of Belper, Derby; and J. J. Randall of Plumstead, London. Congratulations one and all.

Entries for the tie break ("1986 is the Year of the Dragon because...") included many references to St George — English and otherwise, but generally our favourite was E. A. Newman's, "because it will be a roaring year."

I hope to be writing to the hot summer we are all praying for!



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